

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of  
Lee D. Whetsel

TI-19785D.2

Div. of Serial No.: 09/686,709

Prior Art Unit: 2133

Filed: herewith

Prior Examiner: E. Moise

Title: Low Overhead Input and Output Boundary Scan Cells

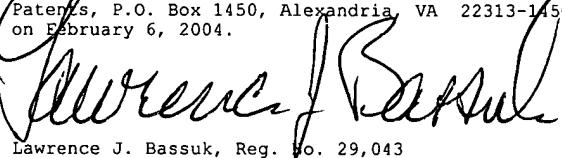
**LETTER TO THE OFFICIAL DRAFTSPERSON**

February 6, 2004

Asst. Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

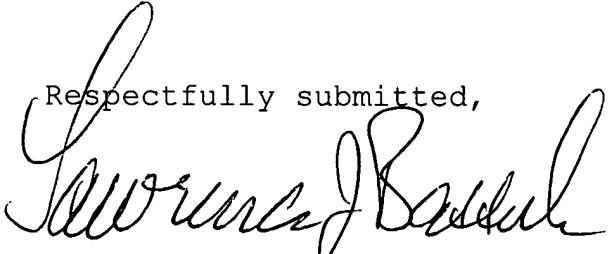
Dear Sir:

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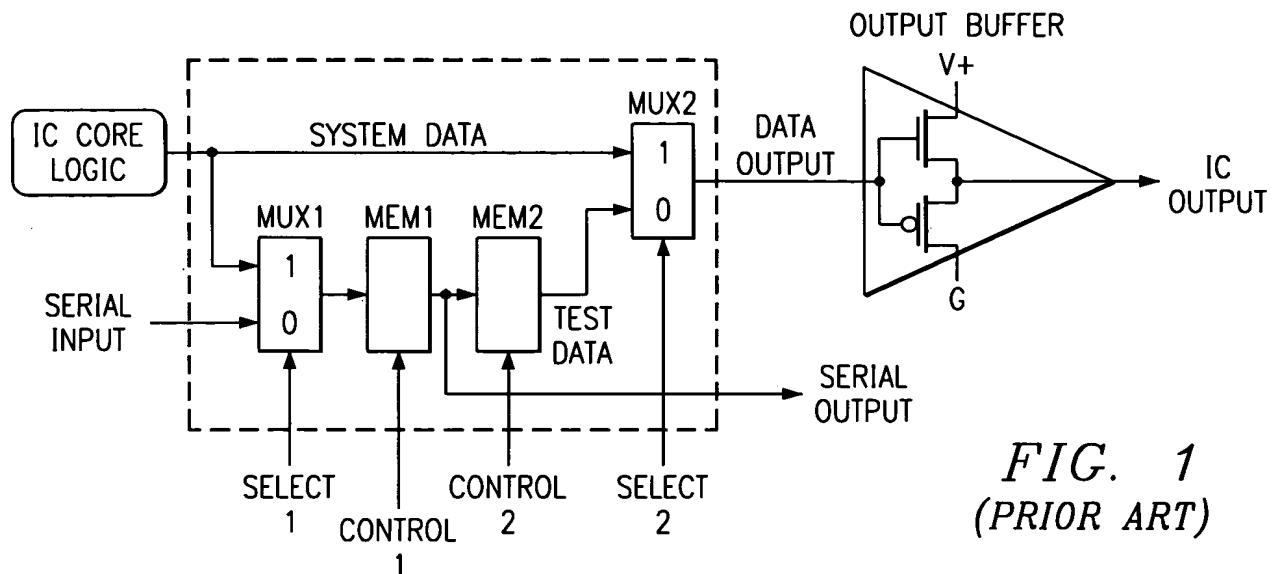
  
Lawrence J. Bassuk, Reg. No. 29,043

Applicant submits 9 sheets of formal drawings for the  
above-identified patent application.

Respectfully submitted,

  
Lawrence J. Bassuk  
Reg. No. 29,043

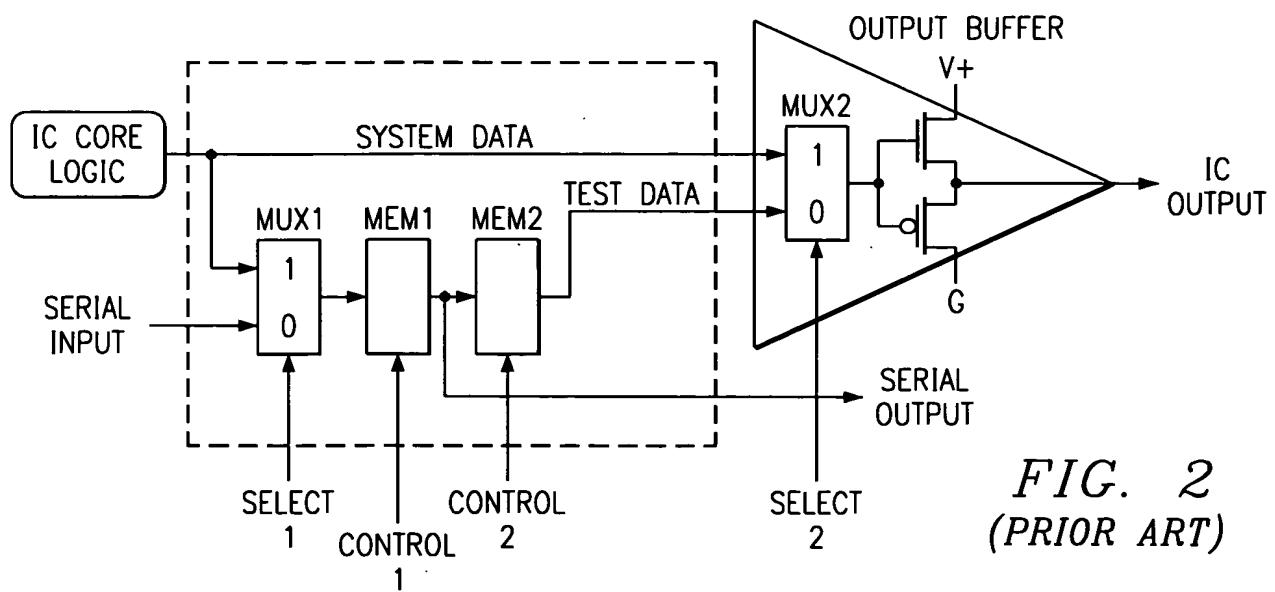
Texas Instruments Incorporated  
P.O. Box 655474, M/S 3999  
Dallas, TX 75265  
(972) 917-5458



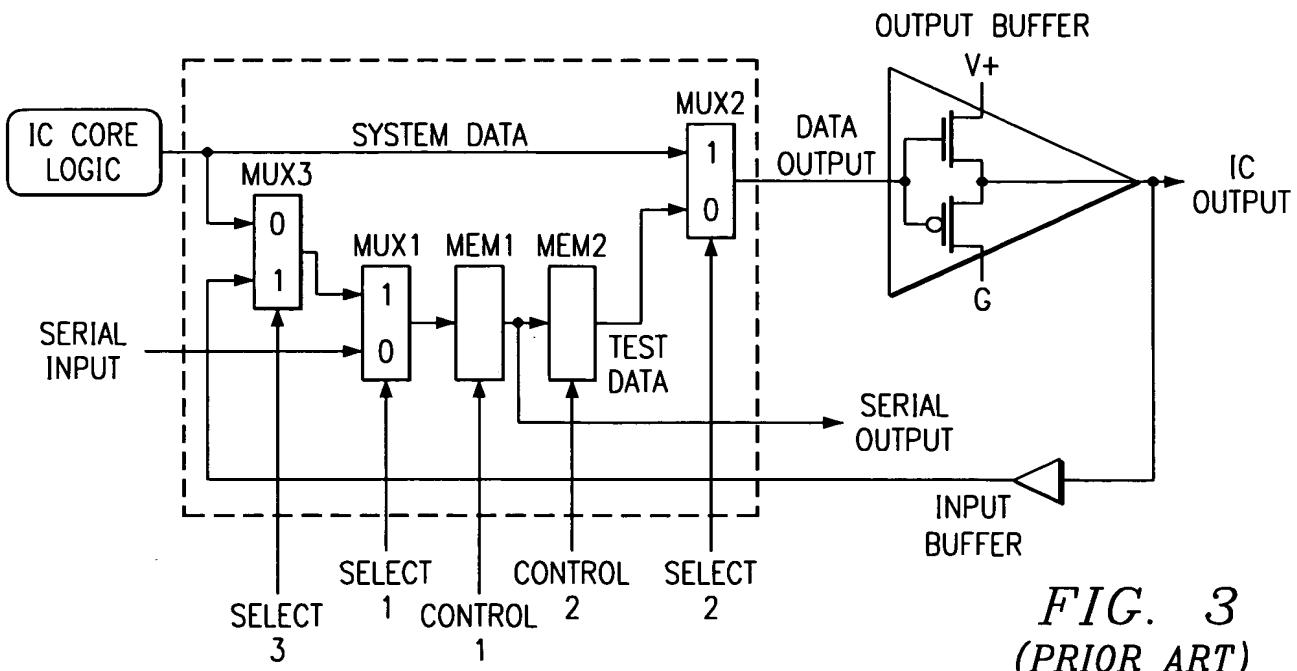
*FIG. 1*  
(PRIOR ART)

<u>OPERATION</u>	<u>SAMPLE</u>	<u>EXTEST</u>	<u>INTEST</u>
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0	0 C C C C C C C 0 0	0 C C C C C C C 0 0
CONTROL 2	0 0 0 0 0 0 0 0 C 0	0 0 0 0 0 0 0 0 C 0	0 0 0 0 0 0 0 0 0 0
SELECT 2	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0

*FIG. 1A*  
(PRIOR ART)



*FIG. 2*  
(PRIOR ART)



*FIG. 3  
(PRIOR ART)*

<u>OPERATION</u>	<u>SAMPLE</u>	<u>EXTEST</u>	<u>INTEST</u>
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0	0 C C C C C C C 0 0	0 C C C C C C C 0 0
CONTROL 2	0 0 0 0 0 0 0 0 C 0	0 0 0 0 0 0 0 0 C 0	0 0 0 0 0 0 0 0 C 0
SELECT 2	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
SELECT 3	0 0 0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0

*FIG. 3A  
(PRIOR ART)*

<u>OPERATION</u>	<u>EXTEST1</u>	<u>EXTEST2</u>	<u>EXTEST3</u>
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0	0 C 0 0	0 C C C C C C C 0 0
CONTROL 2	0 0 0 0 0 0 0 0 C 0	0 0 C 0	0 0 0 0 0 0 0 0 C 0
SELECT 2	0 0 0 0 0 0 0 0 0 0	0 0 0 0	0 0 0 0 0 0 0 0 0 0
SELECT 3	1 1 1 1 1 1 1 1 1 1	1 1 1 1	1 1 1 1 1 1 1 1 1 1

*FIG. 3B  
(PRIOR ART)*

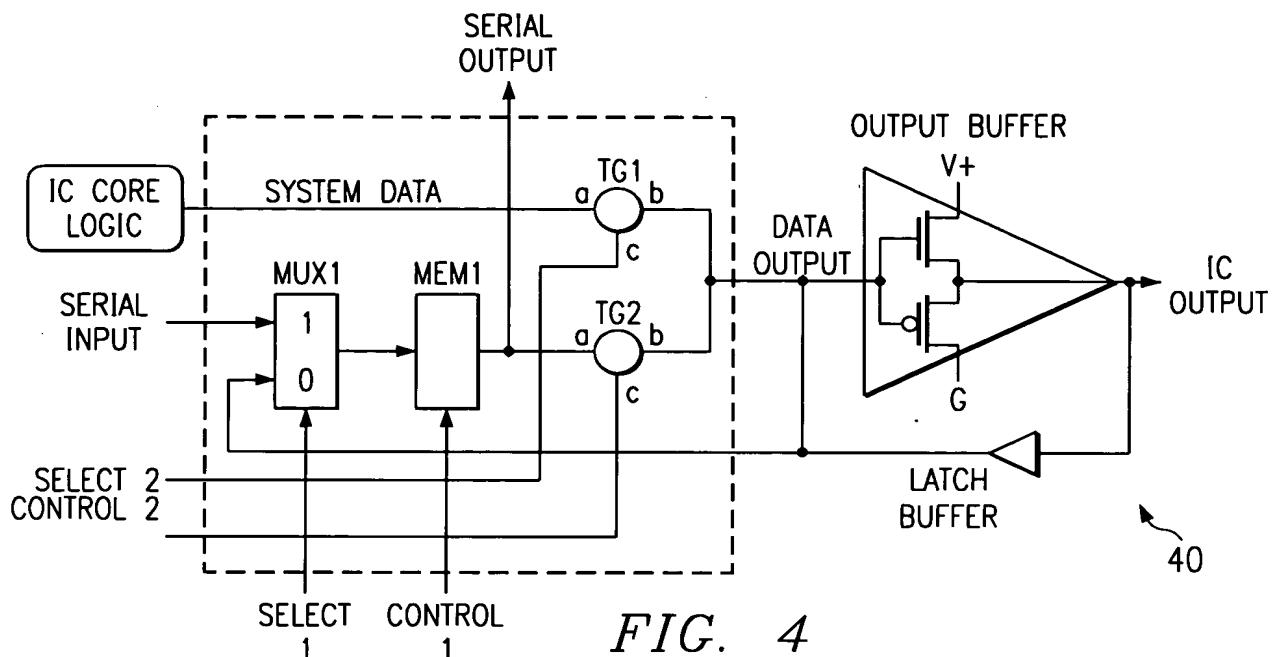


FIG. 4

<u>OPERATION</u>	<u>SAMPLE</u>	<u>EXTTEST</u>
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0	0 C C C C C C C 0 0
CONTROL 2	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 C 0
SELECT 2	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0

→ TIME  
FIG. 4A

<u>OPERATION</u>	<u>EXTTEST</u>
SELECT 1	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0
CONTROL 2	1 0 0 0 0 0 0 0 1 1
SELECT 2	0 0 0 0 0 0 0 0 0 0

→ TIME  
FIG. 4B

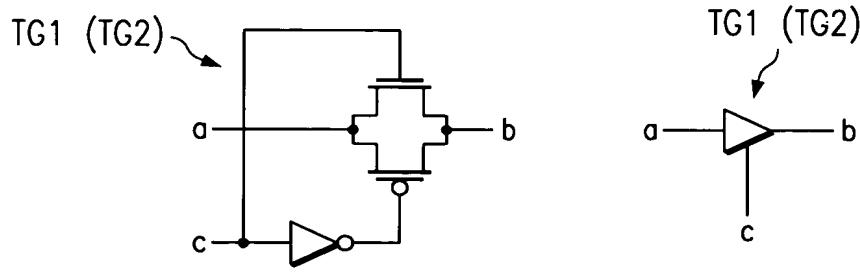


FIG. 5

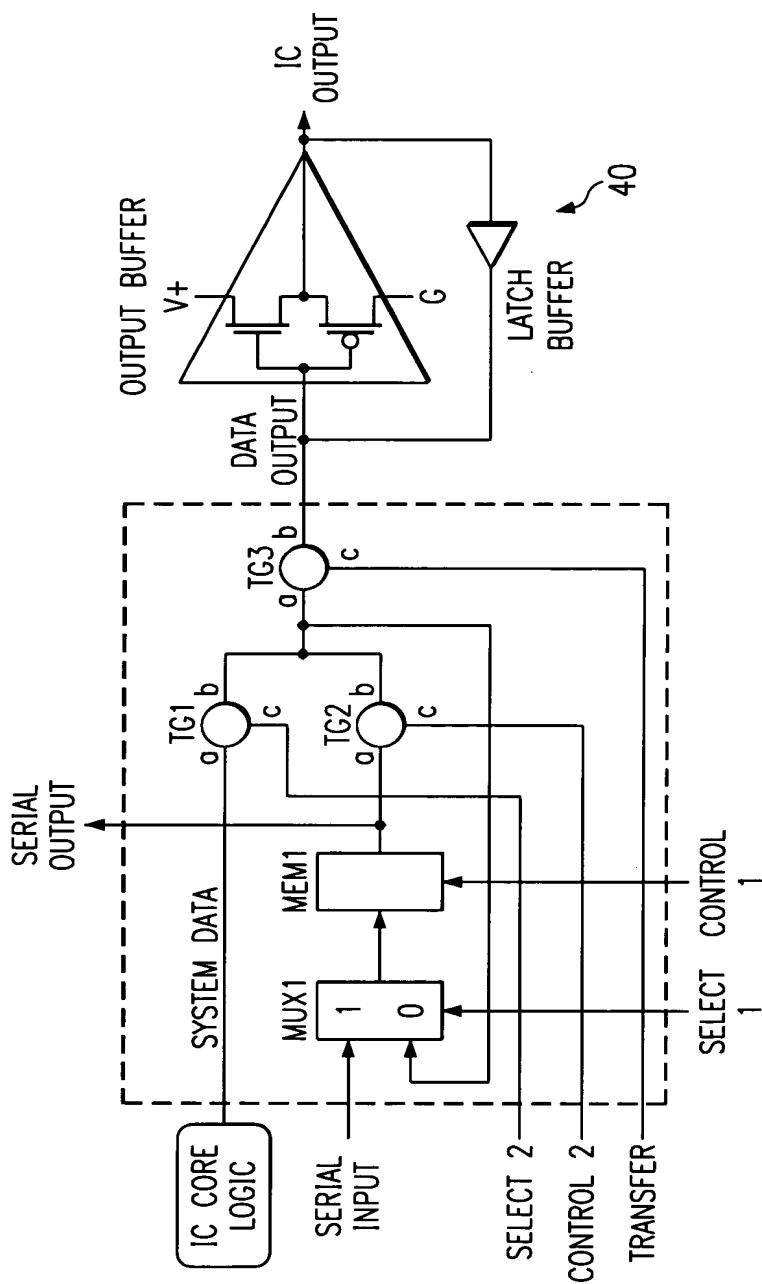


FIG. 6

→ TIME

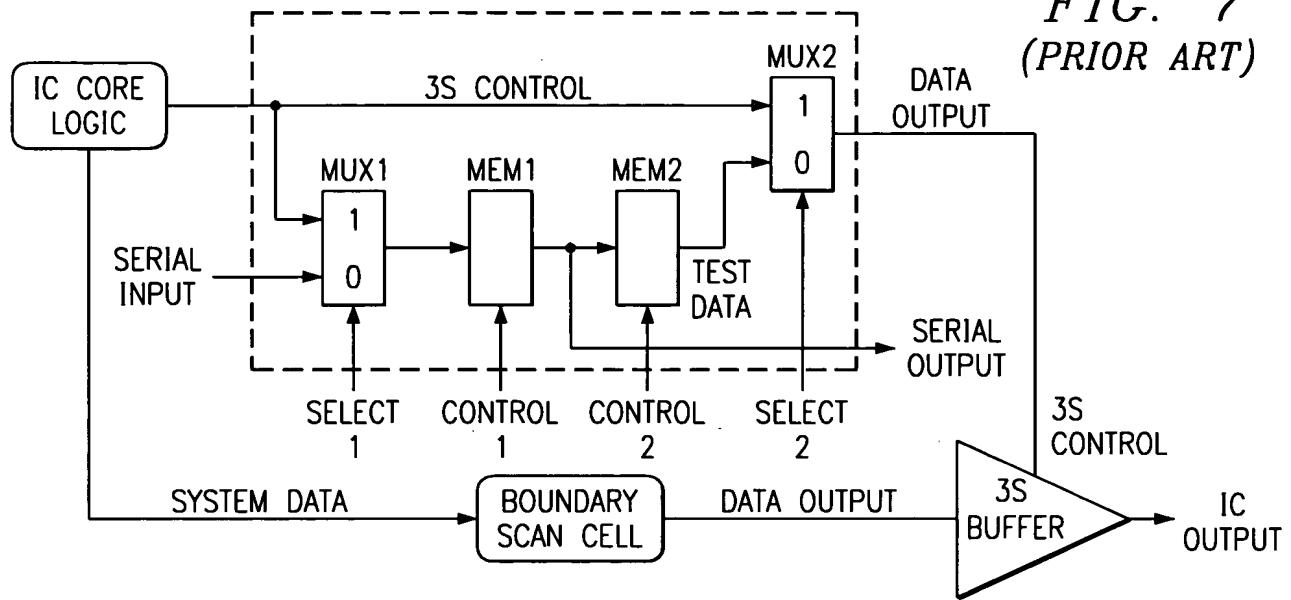
OPERATION	SAMPLE	EXTEST	INTEST
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C C C	0 C C C C C C C C C	0 C C C C C C C C C
CONTROL 2	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
SELECT 2	1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
TRANSFER	1 1 1 1 1 1 1 1 1 1	0 1 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0

FIG. 6A

FIG. 6B

OPERATION	EXTEST	INTEST
SELECT 1	0 1 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
CONTROL 1	0 C C C C C C C 0 0	0 C C C C C C C 0 0
CONTROL 2	1 0 0 0 0 0 0 0 1 1	1 0 0 0 0 0 0 0 1 1
SELECT 2	0 0 0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0 0 0
TRANSFER	1 1 0 0 0 0 0 0 1 1	1 0 0 0 0 0 0 0 1 1

→ TIME

FIG. 7  
(PRIOR ART)

80

81

82

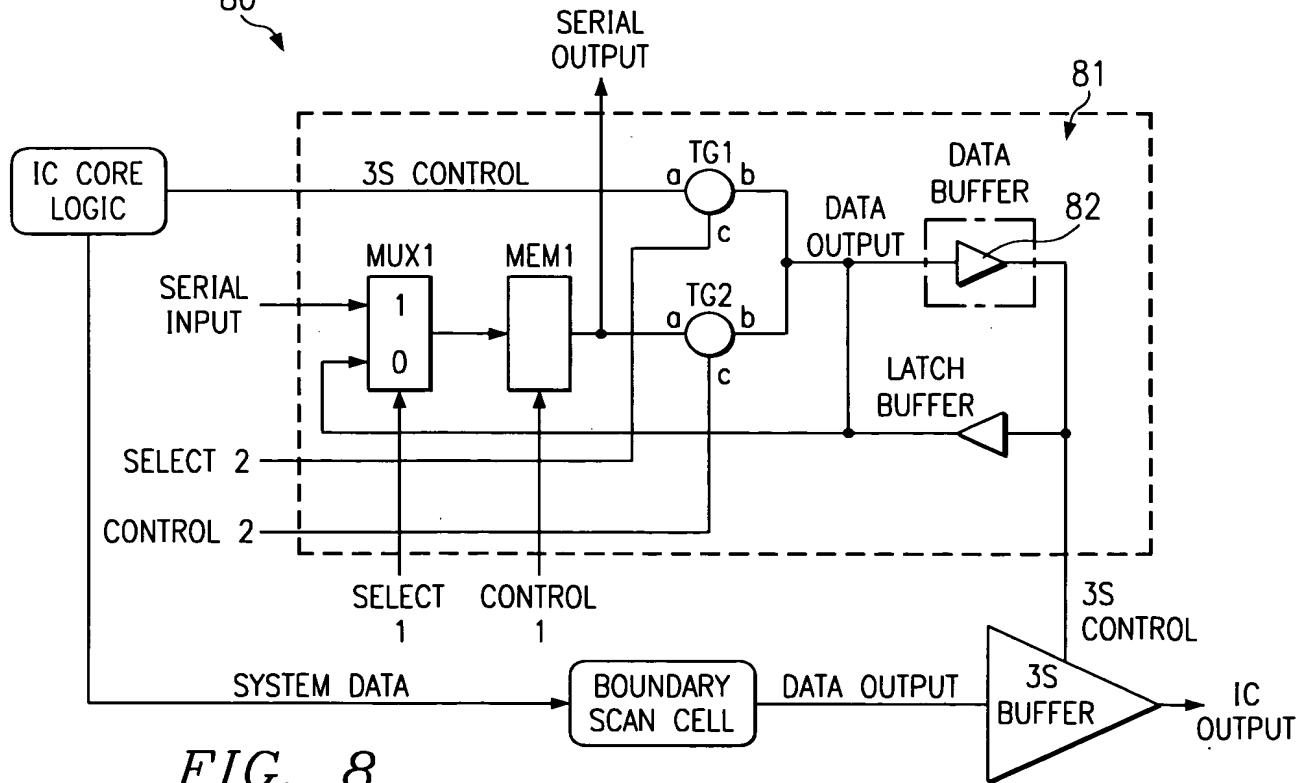


FIG. 8

